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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Lester J. Vincent  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
Seventh Floor  
12400 Wilshire Boulevard  
Los Angeles, CA 90025-1026

EXAMINER
PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 05.06.2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/053,810

Applicant(s)

CHEN ET AL

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 February 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 17-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) : \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of group I, claims 1-10 and 17-19, a printed circuit board, is acknowledged.

***Claim Objections***

2. Claim 6 is objected to because of the following informalities: "conductive tape" seems a typographical mistake, instead of - - conductive ink - -.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 17, the applicant claims a means for high frequency current return path and a means for reducing the radiation from the plane split. However, structural description, as disclosed, describe only one structure for both the purposes, providing the high frequency current return path and reducing the radiation from plane splits of a printed circuit board.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-10 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmer, US Patent No. 5,131,140, in view of Brown et al., US Patent No. 5,428,506, hereafter Brown.

Regarding claim 1, Zimmer discloses a printed circuit board comprising:

a power layer (power plane 5, see figure 1, column 2, line 4-15), wherein

the power layer has n plane splits, wherein n is an integer greater than or equal to one (ground and / or power plane may be split, see figure 2, column 2, line 40-50);

a ground layer (a ground plane 2, see figure 1, column 2, line 4-15),

but fails to explicitly disclose a lossy material added to each of the n splits.

Rather, Zimmer discloses a conductive tape for connecting the plane splits.

Brown discloses a lossy material between two power planes, see, Brown, column 3, line 30-40, for reducing the electromagnetic interference at high frequency. Brown

further discloses various combinations for different conductivity and resistivity of the lossy material based on the specific system requirement.

A person of ordinary skill in the art will be able to use the lossy material with desired conductive value for connecting the split planes of Zimmer, instead of making vias and using a conductive tape to lower the manufacturing cost.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of Zimmer with a lossy material connecting the split plane, as taught by Brown, for controlling electromagnetic interference (EMI) at a lower cost.

Regarding claims 2-4, the applicant is claiming the lossy material with a DC impedance range of about 1,000 ohm to 10, 000 ohm as claimed in claim 2, the lossy material with a conductivity range of about 100 Mho/meter to 1000 Mho/meter, as claimed in claim 3 and the lossy material has electrical attributes consistent between about 100 Megahertz to 1 Gigahertz, as claimed in claim 4.

Brown discloses that the characteristics of the lossy material can be changed to the desired value by changing constituents of the lossy material depending upon the system requirement, see Brown, column 3, line 47 to column 4, line 45.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Zimmer with a lossy material having characteristic as claimed in claims 2-4, as taught by Brown, for controlling electromagnetic interference to desired value.

Regarding claim 5 and 6, the combination of Zimmer and Brown further discloses the lossy material is a conductive ink, (lossy material may be formulated as a paste having a conductive fiber of copper, nickel etc. which may very well include silver, see Brown column 2, line 51-60).

Regarding claim 7, the combination of Zimmer and Brown further discloses the lossy material is a tape, (the tape of Zimmer can be made of lossy material).

Regarding claim 8, the combination of Zimmer and Brown further discloses the ground plane with plurality of splits, ((ground and / or power plane may be split, see figure 2, column 2, line 40-50).

Regarding claim 9, though the combination of Zimmer and Brown does not explicitly disclose the lossy material added to each of the plurality of splits in the ground plane, it can be provided depending upon the routing of the high frequency traces and the control of EMI required.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Zimmer with a lossy material added to each of the plurality of splits in the ground plane, depending upon the routing of the traces, for better control of EMI.

Regarding claim 10, though the combination of Zimmer and Brown discloses six layer circuit board, the multilayer circuit boards with any number of required layers, are well known in the art, the number of layers can be decided depending upon the component density and flexibility of routing the traces with the cost optimization.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of Zimmer with four layers in order to have the circuit board with desired characteristic with optimum cost.

Regarding claims 17-19, the combination of Zimmer and Brown discloses all the features of the claimed invention, including the means for providing a high frequency return path, a means for reducing the radiation from plane splits, the means for reducing the routing complexity and a means for reducing the waveform distortion of signals as applied to claim 1 above.

**Conclusion**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Price et al., discloses a printed circuit board having a split power planes.

Lee et al., disclose printed circuit board with metal layer isolated divided in section with different voltage levels.

Tran discloses a multilayer circuit board with discrete voltage supply planes.

Hailey discloses a printed circuit board with split metallic conducting planes.

Gianni et al., discloses a circuit board with power plane subdivided into plurality of power islands.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (8:30 - 5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

*John B. Vigushin*  
John B. Vigushin  
EXAMINER  
GAC 2827

ibp  
May 3, 2003.